

Geosynthetic Reinforced Unpaved Road: Literature Study and Design Example

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Abstract : This paper, in its first part, presents the state-of-the-art literature of design approaches for geosynthetic reinforced unpaved roads. The literature starting since 1970 and the critical appraisal of flexible pavement design by Giroud and Han (2004) and Jonathan Fannin (2006) is presented. The design example is illustrated for Indian conditions. The example emphasizes the results computed by Giroud and Han's (2004) design method with the Indian road congress guidelines by IRC SP 72 -2015. The input data considered are related to the subgrade soil condition of Maharashtra State in India. The unified soil classification of the subgrade soil is inorganic clay with high plasticity (CH), which is expansive with a California bearing ratio (CBR) of 2% to 3%. The example exhibits the unreinforced case and geotextile as reinforcement by varying the rut depth from 25 mm to 100 mm. The present result reveals the base thickness for the unreinforced case from the IRC design catalogs is in good agreement with Giroud and Han (2004) approach for a range of 75 mm to 100 mm rut depth. Since Giroud and Han (2004) method is applicable for both reinforced and unreinforced cases, for the same data with appropriate N_c factor, for the same rut depth, the base thickness for the reinforced case has arrived for the Indian condition. From this trial, for the CBR of 2%, the base thickness reduction due to geotextile inclusion is 35%. For the CBR range of 2% to 5% with different stiffness in geosynthetics, the reduction in base course thickness will be evaluated, and the validation will be executed by the full-scale accelerated pavement testing set up at the College of Engineering Pune (COE), India.

Keywords : base thickness, design approach, equation, full scale accelerated pavement set up, Indian condition

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